

a 1.. (amended) An incremental printer for forming de-
b sired images on a printing medium, by construction from
c individual marks in arrays; said printer comprising:
d at least one colorant-placing module for marking on
e such medium;
f a colorant carriage for holding and moving the mod-
g ules over such medium;
h a motor and drive train for propelling said carriage
i over such medium;
j a first sensor, mounted to said carriage, for deter-
k mining condition or relative positioning of the at least
l one colorant-placing module; [and]
m a second sensor for making color measurements of
n mark[ing] arrays formed on such medium by the at least
o one module;
p an auxiliary carriage for holding and moving the
q second sensor over such medium; said auxiliary carriage
r being selectively attachable to and detachable from the
s colorant carriage, but having substantially no drive
t train other than that of the colorant-carriage drive
u train; and
v means for controlling the motor and drive train,
w while the carriages are attached, to position the col-
x orant carriage and thereby the auxiliary carriage for
y substantially stationary measurement of such a mark array
z on such medium.

a 2. (amended) The printer of claim 1, wherein:
b the second sensor is for making colorimetric meas-
c urements of the mark[ing] arrays.

a 7. (amended) An incremental [The] printer for forming
b desired images on a printing medium, by construction from
c individual marks in arrays; said printer comprising:
d at least one colorant-placing module for marking on
e such medium;
f a first sensor for determining condition or relative
g positioning of the at least one colorant-placing module;
h a second sensor for making color measurements of
i marking arrays formed on such medium by the at least one
j module; and
k means for excluding ambient light from the second
l sensor during the making of color measurements [of claim
m 6], wherein the ambient-light excluding means comprise:
n a hood generally surrounding the second sensor lat-
o erally with respect to a sensing direction; and
p a mechanism for advancing the hood along the sensing
q direction toward such medium.

a 8. (amended) An incremental [The] printer for forming
b desired images on a printing medium, by construction from
c individual marks in arrays; said printer comprising:
d at least one colorant-placing module for marking on
e such medium;
f a first sensor for determining condition or relative
g positioning of the at least one colorant-placing module;
h a second sensor for making color measurements of
i marking arrays formed on such medium by the at least one
j module; and [of claim 1, further comprising:]
k a mechanism for advancing the second sensor into a
l measurement position at only low velocity and only low
m positioning accuracy needed for roughly centering the
n second sensor over successive colorimetric test-pattern
o patches in turn.

a 11. (amended) An incremental printer for forming de-
b sired images on a printing medium, by construction from
c individual marks in arrays; said printer comprising:
d at least one colorant-placing module for marking on
e such medium;
f a first carriage for holding and moving [scanning]
g the colorant-placing module over such medium; and
h a motor and drive train for propelling said first
i carriage over such medium;
j a second carriage, discrete from the first carriage,
k for use in refining the quality of images produced by the
l printer; said auxiliary carriage being selectively at-
m tachable to and detachable from the first carriage, but
n having substantially no drive train other than that of
o the first-carriage drive train; and
p means for controlling the motor and drive train,
q while the carriages are attached, to position the first
r carriage and thereby the second carriage for substantial-
s ly stationary operation in refining the quality of im-
t ages.

a 14. (twice amended) An incremental [The] printer for
b forming desired images on a printing medium, by construc-
c tion from individual marks in arrays; said printer
d comprising:
e at least one colorant-placing module for marking on
f such medium;
g a first carriage for scanning the colorant-placing
h module over such medium; and
i a second carriage, discrete from the first carriage,
j for use in refining the quality of images produced by the
k printer; [of claim 11,]
l wherein [:] the second carriage scans a sensor over
m such medium at only low velocity and only low positioning
n accuracy needed for roughly centering the second sensor
o over successive colorimetric test-pattern patches in
p turn.

a 21. (amended) The printer of claim 20 [21], wherein:
b the hood comprises, at a forward surface thereof, a
c compliant material for facilitating an effective contact
d between the hood and such medium.

a 26. (amended) An incremental printing system for forming desired images on a printing medium, by construction from very large numbers of individual liquid-ink drops ejected onto such medium in arrays; said printer comprising:

f at least one inkdrop-placing module for ejecting very large numbers of liquid-ink drops onto such medium substantially whenever the printing system is in use for forming images;

j at least one colorimetric sensor, having at least one optical surface, for infrequently measuring, substantially when the printing system is not in use for forming images, colorimetric characteristics of ink previously received on such medium from the at least one inkdrop-placing module;

p an automatic microprocessor for using the measured colorimetric characteristics in refining operation of the inkdrop-placing module, to optimize the colorimetric quality of images formed on such medium thereafter;

t a door for protecting the at least one optical surface of the at least one sensor from being coated by atmospherically carried residual liquid ink when the at least one sensor is not in use, including whenever the printing system is in use for forming images; and

y a mechanism for automatically opening the door before use of the at least one sensor, and for automatically closing the door after use of the at least one sensor;

cc wherein the microprocessor can reliably optimize the colorimetric quality of images, free from measurement degradation by coating of liquid ink on the at least one optical surface.

a 43. (amended) An incremental [The] printer for forming
b desired images on a printing medium, by construction from
c individual marks in arrays; said printer comprising:
d at least one colorant-placing module for marking on
e such medium;
f a sensor for measuring color properties of colorant
g marked on such medium by the colorant-placing module;
h a moving carriage for automatically positioning the
i sensor over colorant on such medium; and
j at least one reference target disposed for exposure
k to the sensor to provide a colorimetric reference mea-
l surement for use in conjunction with said measured color
m properties of colorant marked on such medium; [of claim
n 42,]
o wherein [:] the at least one reference target is
p carried on the moving carriage.

a 44. (amended) The printer of claim 43 [42], wherein:
b the at least one reference target is stationary, and
c the moving carriage comprises means for automatically
d positioning the sensor over the at least one reference
e target.

a 46. (amended) The printer of claim 43 [42], wherein:
b the at least one reference target comprises a white
c target.

a 48. (amended) The printer of claim 43 [42], wherein:
b the at least one reference target comprises one or
c more gray targets.

Sub F1

Clean copies: Following are clean copies of the same claims. For the Examiner's convenience, the claims have been placed in dependency order as amended (new claims 50 and 51 to follow claims 8 and 14 respectively, and claims 27 through 31 moved to follow claim 32):

- 1 1. (amended) An incremental printer for forming desired
 - 2 images on a printing medium, by construction from indi-
 - 3 vidual marks in arrays; said printer comprising:
 - 4 at least one colorant-placing module for marking on
 - 5 such medium;
 - 6 a colorant carriage for holding and moving the mod-
 - 7 ules over such medium;
 - 8 a motor and drive train for propelling said carriage
 - 9 over such medium;
 - 10 a first sensor, mounted to said carriage, for deter-
 - 11 mining condition or relative positioning of the at least
 - 12 one colorant-placing module;
 - 13 a second sensor for making color measurements of
 - 14 mark arrays formed on such medium by the at least one
 - 15 module;
 - 16 an auxiliary carriage for holding and moving the
 - 17 second sensor over such medium; said auxiliary carriage
 - 18 being selectively attachable to and detachable from the
 - 19 colorant carriage, but having substantially no drive
 - 20 train other than that of the colorant-carriage drive
 - 21 train; and
 - 22 means for controlling the motor and drive train,
 - 23 while the carriages are attached, to position the col-
 - 24 orant carriage and thereby the auxiliary carriage for
 - 25 substantially stationary measurement of such a mark array
 - 26 on such medium.
-

*C.J.
mid.*

1 2. (amended) The printer of claim 1, wherein:
2 the second sensor is for making colorimetric meas-
3 urements of the mark arrays.

1 7. (amended) An incremental printer for forming desired
2 images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a first sensor for determining condition or relative
7 positioning of the at least one colorant-placing module;
8 a second sensor for making color measurements of
9 marking arrays formed on such medium by the at least one
10 module; and
11 means for excluding ambient light from the second
12 sensor during the making of color measurements, wherein
13 the ambient-light excluding means comprise:
14 a hood generally surrounding the second sensor lat-
15 erally with respect to a sensing direction; and
16 a mechanism for advancing the hood along the sensing
17 direction toward such medium.

1 8. (amended) An incremental printer for forming desired
2 images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a first sensor for determining condition or relative
7 positioning of the at least one colorant-placing module;
8 a second sensor for making color measurements of
9 marking arrays formed on such medium by the at least one
10 module; and
11 a mechanism for advancing the second sensor into a
12 measurement position at only low velocity and only low
13 positioning accuracy needed for roughly centering the
14 second sensor over successive colorimetric test pattern
15 patches in turn.

pk

*Sub
pt*

1 11. (amended) An incremental printer for forming de-
2 sired images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a first carriage for holding and moving the col-
7 orant-placing module over such medium; and
8 a motor and drive train for propelling said first
9 carriage over such medium;
10 a second carriage, discrete from the first carriage,
11 for use in refining the quality of images produced by the
12 printer; said auxiliary carriage being selectively at-
13 tachable to and detachable from the first carriage, but
14 having substantially no drive train other than that of
15 the first-carriage drive train; and
16 means for controlling the motor and drive train,
17 while the carriages are attached, to position the first
18 carriage and thereby the second carriage for substantial-
19 ly stationary operation in refining the quality of im-
20 ages.

*Sub
v
15*

14. (twice amended) An incremental printer for forming
desired images on a printing medium, by construction from
individual marks in arrays; said printer comprising:
at least one colorant-placing module for marking on
such medium;
a first carriage for scanning the colorant-placing
module over such medium; and
a second carriage, discrete from the first carriage,
for use in refining the quality of images produced by the
printer;
wherein the second carriage scans a sensor over such
medium at only low velocity and only low positioning
accuracy needed for roughly centering the second sensor
over successive colorimetric test-pattern patches in
turn.

16

21. (amended) The printer of claim 20, wherein:
the hood comprises, at a forward surface thereof, a
compliant material for facilitating an effective contact
between the hood and such medium.

1 26. (amended) An incremental printing system for forming
2 desired images on a printing medium, by construction
3 from very large numbers of individual liquid-ink drops
4 ejected onto such medium in arrays; said printer
5 comprising:

6 at least one inkdrop-placing module for ejecting
7 very large numbers of liquid-ink drops onto such medium
8 substantially whenever the printing system is in use for
9 forming images;

10 at least one colorimetric sensor, having at least
11 one optical surface, for infrequently measuring, substantially
12 when the printing system is not in use for forming
13 images, colorimetric characteristics of ink previously
14 received on such medium from the at least one inkdrop-
15 placing module;

16 an automatic microprocessor for using the measured
17 colorimetric characteristics in refining operation of the
18 inkdrop-placing module, to optimize the colorimetric
19 quality of images formed on such medium thereafter;

20 a door for protecting the at least one optical surface
21 of the at least one sensor from being coated by atmospherically carried residual liquid ink when the at
22 least one sensor is not in use, including whenever the
23 printing system is in use for forming images; and

25 a mechanism for automatically opening the door before use of the at least one sensor, and for automatically closing the door after use of the at least one
26 sensor;

29 wherein the microprocessor can reliably optimize the
30 colorimetric quality of images, free from measurement
31 degradation by coating of liquid ink on the at least one
32 optical surface.

1 43. (amended) An incremental printer for forming de-
2 sired images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
(8)
6 a sensor for measuring color properties of colorant
7 marked on such medium by the colorant-placing module;
8 a moving carriage for automatically positioning the
9 sensor over colorant on such medium; and
10 at least one reference target disposed for exposure
11 to the sensor to provide a colorimetric reference mea-
12 surement for use in conjunction with said measured color
13 properties of colorant marked on such medium;
14 wherein the at least one reference target is carried
15 on the moving carriage.

1 44. (amended) The printer of claim 43, wherein:
2 the at least one reference target is stationary, and
3 the moving carriage comprises means for automatically
4 positioning the sensor over the at least one reference
5 target.

(9)
1 46. (amended) The printer of claim 43, wherein:
2 the at least one reference target comprises a white
3 target.

(10)
1 48. (amended) The printer of claim 43, wherein:
2 the at least one reference target comprises one or
3 more gray targets.